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BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY

Vol. XLIV 1912 No. 7

PROGRESS OF ALASKAN TOPOGRAPHIC SURVEYS (BY THE UNITED STATES GEOLOGICAL SURVEY)

BY

R. H. SARGENT*

(Two maps opposite p. 560.)

The first rumor of land to the east of Siberia reached St. Petersburg during the early part of the eighteenth Century. Peter the Great, then Czar of Russia, realized at once the importance of such a discovery and in 1728 sent out an expedition under Vitus Bering to verify this rumor. Sailing along the east coast of Siberia to East Cape,† Bering steered to the northeast for one day, when, without sighting land, he returned to port.

Subsequent trips were made by Russian explorers, but it was not until 1741 that Bering, while on another trip, discovered Alaska, first sighting Mount St. Elias, now a cornerstone on the eastern boundary of the Territory. The report of valuable furs in the islands to the east of Kamchatka which was brought by Bering's crew led many Siberian fur hunters to these islands and the adjacent mainland. It was through the daring fur traders that the world first learned of the Aleutian Islands.

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† In 1898, by command of the Emperor of Russia, the name of East Cape, the most eastern point of Asia (Siberia), was changed to Cape Deshnef in honor of the explorer who discovered it. The new name has now appeared for years on all or nearly all of the maps published in continental Europe, on many maps printed in the United Kingdom and in authoritative gazetteers and encyclopedias. The latest edition of the *Encyclopædia Britannica* has Cape Dezhnev (East Cape) on its map of Asia but East Cape in its text. Many geographical societies are using the new name and this seems certain to become the common usage.—EDITOR.

Practically nothing was accomplished in obtaining geographical data until 1778, when Captain Cook, the noted English explorer, sailed along the west coast of North America in search of the much-debated Northwest Passage. He was not successful in discovering a passage to Hudson Bay, but in a single summer he obtained much more valuable data than all previous explorers. He made the first systematic surveys of any part of what is now Alaska. He outlined the larger coastal features from 58° to 70° N. L., and his maps were for many years the only ones of much of this coast.

In 1793-94 George Vancouver, also an English explorer, charted the coast between 35° and 60° N. L., and in the two seasons executed a survey of thousands of miles of shore line. Considering that the narrow and intricate waterways of the Alexander Archipelago were traversed with sailing vessels and row boats and that the instruments and methods employed were inferior to those in present use, Vancouver's surveys in extent and accuracy are little less than marvelous.

Exploring and charting the coast line were gradually continued by Spanish, English, and Russian Naval officers, members of the Russian-American Fur Company, and others, until in 1837 the entire coast had been mapped in a general way. Explorations were made of the lower parts of the Yukon, the Kuskokwim, and the Susitna rivers by the Russian Company in extending its fur trade.

The first white men to travel entirely across Alaska were members of a Western Union Telegraph Expedition who, in 1867, made a traverse of the Yukon River from Nulato to Fort Yukon. They thus established the identity of the Yukon of the Hudson Bay Company in the east with the Kwikpak of the Russians in the west.

At the time Alaska was purchased from Russia the entire coast line had been mapped with varying degrees of accuracy. The lower reaches of the Yukon, the Kuskokwin, and the Susitna rivers had been explored and sketched, and a foot-traverse made of the Yukon from Nulato to Fort Yukon. Of the remainder of the interior little was known and the general impression prevailed that the Territory was a land of ice and snow. This is not surprising, since nearly the entire coast from Cross Sound to Cook Inlet is flanked by a bulwark of high and rugged mountains covered deeply by snow in winter which remains until late into the summer and in many instances throughout the year.

The first official map of Alaska by the United States Government was compiled for the State Department by the Coast and Geodetic Survey in 1867, and shows our great lack of knowledge of the interior at that time. Soon after the transfer of the Territory systematic surveys of the coast were inaugurated by the Coast and Geodetic Survey, on which it has been actively engaged ever since. During the eighties a few expeditions in charge of officers of the Army, Navy, Revenue Cutter Service, and others were made along the principal rivers. Among these officers were Lieut. Schwatka and Lieut. Allen of the Army, Lieut. Stoney of the Navy, and Lieut. Cantwell of the Revenue Cutter Service. In 1883, Schwatka made a complete traverse of the Yukon, which for years remained the only authentic data of the entire river. Lieut. Allen's expedition was the most remarkable one in the history of the Territory. Landing at the mouth of the Copper River, he proceeded up the Copper, across to the Tanana, and down this stream to the Yukon, then across to the Koyukuk, which he explored from the Arctic Circle to the Yukon. Crossing from the lower Yukon to Norton Sound, he reached St. Michael after a journey of over one thousand miles. In the north, Stoney and Cantwell explored the Kobuk River, and a member of Stoney's party crossed to the Colville, thence to the Chipp, which he followed to the Arctic Ocean, being the first white man to cross northern Alaska. While some of these expeditions were remarkable feats of daring and hardships, geographically the results were limited, since they were surveys of but very narrow belts along the rivers.

While a somewhat more exact geographic knowledge of the Territory gradually developed through the information received from the hardy prospectors and fur traders as well as from official sources, it was not until 1895, nearly thirty years after its purchase, that Congress awoke to the importance of more systematic surveys of the interior and the investigation of Alaska's mineral wealth. The investigation of the mineral resources of the Territory has been intrusted to the United States Geological Survey. The investigation of the mineral resources demand that geological surveys be made and the successful correlation and study of the data acquired necessitate the construction of base maps of the areas covered by the investigations.

The work of the United States Geological Survey in Alaska from the accession of the Territory up to and including 1904 has been described by Alfred H. Brooks in an article* published in the *Bulletin* of the American Geographical Society.

The maps of Alaska published by the United States Geological Survey are divided for convenience of designation into three general types: exploratory maps (1:625,000, or nearly ten miles to an inch, contour interval 200 feet); reconnaissance (1:250,000, or about 4 miles to an inch, contour interval 200 feet); detailed maps (1:62,500, or a little less than one mile to an inch, contour interval 25, 50, or 100 feet according to the relief). The scale of publication is governed by the accuracy and the amount of detail with which the field work is executed. In exploratory surveys, modes of travel and methods of survey are adopted which permit of the maximum speed, since the object is to procure as much geographical data as possible, and exact geodetic position is subordinated to the collection of these data. Such surveys are usually route traverses in which directions are generally obtained by use of the magnetic needle and in most instances distances are measured by stadia or micrometer measurements. Sometimes, where the transportation is by canoe the speed of the boat down stream is estimated or the distance is paced along the bank of the river. In most cases plane tables are used upon which the traverse is platted in the field and the adjacent topography delineated. Frequent astronomical observations for latitudes and azimuth are made by means of which the geodetic position of the surveys is determined.

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* The Investigation of Alaska's Mineral Wealth: Vol. XXXVII, No. 1, Jan. 1905, pp. 26-40.

Reconnaissance maps are executed in greater detail than exploratory maps and are results of areal rather than route surveys. Regular plane table methods are employed, supplemented by locating control points by the more exact method of instrumental triangulation. In many instances observations for latitude and azimuth are made by the topographer who is doing the mapping. In such cases the longitudes of the surveys are obtained by connections with previously located areas. These connections are often unsatisfactory, but it is considered that the accuracy is much greater than it would be possible to obtain by time observations and comparisons under the existing conditions. Along the southern coast the geodetic control of the Coast and Geodetic Survey is so well extended that many of the surveys have been connected directly with it.

Detailed maps of certain small areas of special economic importance are made on a larger scale and in greater detail and accuracy than is furnished by the reconnaissance maps. These surveys are executed by the same methods and with the same accuracy as similar surveys in the states and have proved of the utmost value in mining and water power developments. While these detailed surveys in themselves are accurate, the geodetic position as in the case of the reconnaissance surveys is often dependent upon astronomic determinations made by the topographer.

The first work of the Geological Survey was mainly of an exploratory nature along the principal rivers. By 1900, exploratory surveys had been executed of most of the principal waterways, thus forming a net work of partially connected surveys, while the intervening areas were large and practically unexplored.

The successive discoveries of rich gold placers in the Klondike in 1896, at Nome in 1898, and at Fairbanks in 1902, attracted thousands of gold seekers to the Territory and created a demand for more exact topographic information. Consequently, purely exploratory or route surveys gave way to reconnaissance or areal surveys. By 1906, practically the entire Seward Peninsula had been mapped, much of the Yukon-Tanana region, and a large area in the Copper River region. Previous to 1905, detailed surveys were inaugurated by mapping an area about Juneau, which is the largest lode gold producing district in the Territory. Demands for similar surveys in the Seward Peninsula were met by mapping an area of 490 square miles extending from Nome northward and another of 440 square miles from Solomon northward, covering the most important placer gold districts of the Peninsula.

The appropriation for the investigation of Alaska's mineral wealth, which was but $25,000 in 1899, was gradually increased to $90,000 in 1909, and $100,000 in 1910, thus making it possible to keep the work more nearly abreast of the mining developments; and the topographic mapping has progressed hand in hand with the geologic investigations. A few exploratory expeditions have been made, but in the main the work has been on the reconnaissance scale.

The Yukon gold fields were the first region where areal mapping was executed. As early as 1898 the Fortymile district was surveyed on the regular reconnaissance scale. The placer gold production of this region gradually increased from barely a thousand dollars in 1884 to over $10,000,000 in 1906, thus creating a demand for added surveys. While work in this region was not continued without interruption, it kept pace with mining development and, by the end of 1910, maps had been made of the entire area lying between the Yukon River on the north, the Alaska Range on the south, the 141st meridian on the east, and the Nenana and the Tanana rivers on the west, with the exception of a few thousand square miles west of the eastern boundary and south of the Tanana River. The area surveyed includes approximately 35,000 square miles, the largest area of contiguous surveys in the Territory. In 1907 a detailed topographic map was made of the Fairbanks district, within the Yukon-

Tanana region, with a view of making a thorough geologic study of the placer deposits and collecting information concerning the occurrence and distribution of placer gold. The area covers 450 square miles and is the richest gold placer district thus far discovered in the Territory.

All surveys in Alaska are of necessity expensive, because of the remoteness of the areas mapped and the shortness of the field season, and in the Yukon-Tanana region the expenses reach the maximum. The field season, which extends from about June 15 to approximately September 15, is governed by the time the Yukon River, which is the regular route, is open to navigation, and by the grass supply where pack horses are used. Fortunately, the dates of Yukon transportation and of available forage very nearly coincide. The average output of one topographic party during a season is approximately 3,000 square miles and the cost per square mile in this region averages about $2.50.

Reconnaisance surveys were commenced in the Copper River region in 1900 and in two years an area of 16,000 square miles was mapped. These earlier surveys, both topographic and geologic, have been of great value to the mining interests. In this particular region the maps of the Geological Survey proved most important as a basis upon which the study of available railroad routes was made by means of which the route followed by the present railroad up the Copper River Valley was selected.

In 1910 the Valdez Creek district was mapped on the reconnaissance scale by two topographic parties, resulting in the survey of an area of nearly 5,000 square miles. This district lies just south of the Alaska Range in approximately longitude 147° W. Valdez Creek, on which is the greatest amount of mining development, is a tributary of the Susitna River, near its head. As a producer of placer gold, attention was first drawn to this creek in 1903, but since other regions of apparently greater importance demanded the immediate attention of the Survey, this district was not surveyed until 1910. The maps of this area add much to the knowledge of the topography of the Alaska Range between longitudes 146° and 148°, and of the headwater region of the Susitna and the Gulkana rivers. Mount Hayes, the highest point in this region, was definitely located and its elevation found to be 13,940 feet. The maps show large glaciers, some of them over twenty miles long, which fill the valleys in the vicinity of Mount Hayes. The survey of the Valdez Creek district was of peculiar interest, because of its remoteness from steam transportation. The supplies for the parties were sent to the locality by sled the previous winter at a cost of $700 per ton, and the members of the parties walked 190 miles before commencing work and 270 miles back to the steamer after having completed the season's work.

The area surveyed in the Valdez Creek region is contiguous to the previously mapped areas of the Copper River Basin to the southeast, and of the Yukon-Tanana region to the north, thus forming a belt of mapped area extending from the coast to the Yukon River.

The rapid industrial advances in the Copper River region have made detailed surveys imperative. The Nizina district, containing rich copper deposits of vast extent to which a very expensive railroad has been built, was naturally chosen as the logical area in which to study the copper deposits with a view to determining if possible the laws governing their occurrence. Accordingly, during the summer of 1908, a detailed topographic map covering an area of 325 square miles was made.

The Kuskokwim River was explored and mapped in 1898 by one of the first parties from the Geological Survey. But not until 1910 were further surveys executed in this part of Alaska. During that year a reconnaissance survey was made of the Innoko region, which lies south and east of the Yukon River in longitude about 156° W. and at the headwaters of Yukon and Kuskokwim drainage. This survey, which covered a region of approximately 3,200 square miles, furnished definite knowledge of an area much of which was almost unknown. While no features of remarkable interest were noted in this area, the headwaters and in some instances the entire courses of streams were definitely located. In addition to this areal mapping, a traverse was made of the Iditarod River from Iditarod City to its confluence with the Innoko River and down that stream to its mouth at Holy Cross on the Yukon. These rivers flow, for the most part, through a featureless plain nearly reduced to base level, and their sinuosity is very great. The traverses represent the courses of the streams at a minimum stage when they are confined within very low banks. During the spring high water, the rivers overflow their banks, flooding the plain for miles on either side and steamboats literally sail across country.

The Susitna valley on the west and the Matanuska valley on the east of the Talkeetna mountains, which lie just north of Cook Inlet, were regions of exploratory surveys during the early period of survey work in Alaska. Subsequent discoveries of valuable coal deposits in the Matanuska Valley drew attention to this region, and in 1906 reconnaissance surveys were made of the Matanuska valley and of as much of the Talkeetna Mountains as was possible during the season. There still remains an unmapped and practically unknown area in the heart of the mountains. The area covered by the survey was about 7,200 square miles.

The coal fields in the Matanuska valley continued to attract attention and received cursory examination and during 1910 a detailed study of the larger part of this field was made. To facilitate the work of correlating the geologic data a detailed topographic map covering an area of 196 square miles was made the previous year.

The only survey which has been executed on the west side of Cook Inlet was made of the region about Lake Iliamna, the largest lake in the Territory. This reconnaissance survey, which commenced on Iliamna Bay on the west coast of Cook Inlet, extended across the rugged mountain range between the Inlet and the Iliamna Lake basin and also covered a large area about Lake Clark. In addition to mapping a large area of the adjacent country, the work yielded the first instrumental survey of Iliamna Lake, which is about 75 miles long and averages 15 miles wide, and Lake Clark which is 50 miles long and averages 3 miles wide. These lakes are less than 100 feet above sea level.

In addition to the reconnaissance surveys which have been mentioned a few additional areas have been mapped by geologists and others incidental to various investigations. Among these surveys was that of an area on the eastern side of the Alaska Range in the vicinity of Mount McKinley. While this map does not cover in detail the area in the immediate vicinity of the mountain, it shows the salient features and covers an area of economic interest and value from a mining standpoint. Earlier maps had been made of the west slope of the range with which the later maps combined to give much knowledge in the vicinity of the highest point on the North American continent.

In 1910 a geologic reconnaissance of the now famous Controller Bay district was made and in 1905 a detailed topographic survey was begun and completed in 1906. Although this map offered little of geographic importance, it has been of much value to the mining interests. The information given by these topographic and geologic surveys has been the basis of the active interest and development in the Controller Bay Coal Field.

In southeastern Alaska detailed surveys have been made of the Juneau gold belt, which extends from Douglas Island northward to and including the Berners Bay district. These surveys cover the areas included within the Juneau district, Eagle River district, and Berners Bay district.

Surveys in Southeastern Alaska have been executed under extreme difficulties. Practically the entire region below an elevation of 2,500 feet is covered by a dense blanket of spruce, cedar, hemlock, brush, and other vegetation, of which the Devil's Club is the most annoying. The luxuriant vegetation and the fallen timber make these forests almost as impenetrable as a tropical jungle. These obstructions to travel and the almost continual rains make surveying in this region very difficult and expensive. The cost per square mile averages about $42.

Other areas in Southeastern Alaska in which mining developments have been sufficient to warrant detailed mapping are the copper districts on Prince of Wales Island. Detailed maps have been made of the Kasaan Peninsula district on the east side of the Island and the Copper Mountain district on the west coast.

In the foregoing an attempt has been made to indicate the geographic and topographic data acquired by the Geological Survey up to 1911. It may be of interest to outline in detail the work of one season, and, accordingly, the expeditions which were made during the past summer are described separately. The work of 1911 varied widely in locality and in scale. For the first time in several years there was an important exploratory expedition, during which a continuous topographic survey was executed. The party, consisting of P. S. Smith, geologist in charge, and C. E. Giffin, topographer, a station assistant, two boatmen, and a cook, proceeded by steamer up the Koyukuk River to the mouth of the Alatna River. Here they loaded their outfit and supplies into three Peterborough canoes and commenced their long journey to the headwaters of the Alatna. At Help-me-jack Creek, a tributary from the west, the topographic surveys of the season were commenced. They were a continuation of similar surveys which had been made in 1901 up the Alatna to this point, thence up the Help-me-jack and down the Kobuk to Kotzebue Sound. At the headwaters of the Alatna the Smith party found a pass 1,000 feet high leading to the headwaters of the Noatak River. Across this pass the supplies, equipment, and boats were portaged for twelve miles by the members of the party. This portage was a difficult task, since the supplies and camp equipment, exclusive of the boats, weighed 1,800 pounds and necessitated five trips for the members of the party. Four and one-half days were consumed in packing the supplies over this pass. Once on the Noatak, the party drifted to its mouth at Kotzebue Sound. Throughout this distance of 650 miles a topographic survey was executed of a heretofore little known and entirely unmapped country covering an area of over 10,000 square miles.

A topographic party in charge of D. C. Witherspoon mapped an area of 1,900 square miles in the Hanagita Valley and Bremner River region. While this area was more accessible than the Noatak region, it was as little known, and the map resulted in authentic information concerning the course of the Bremner River and its tributaries.

Mr. Witherspoon's party consisted of himself, a station assistant, two packers, and a cook. Transportation was by a pack train of eight horses. Since in the region traversed there was no possibility of procuring supplies, rations for the entire season were carried, which necessitated many double trips during the earlier part of the season. Before visiting the Hanagita Valley country the same party made surveys along the face of the mountains from Cordova eastward to the Copper River, and the last month of the season was spent in extending a system of triangulation from an astronomic station at Copper Center southward to connect with a station in the Hanagita Valley country.

Another topographic party, consisting of five men and seven horses, of which the writer was in charge, landed at Homer, a small town on Kachemak Bay on the east side of Cook Inlet. Traveling also by pack train, their course lay eastward along the north shore of the bay and for 35 miles up the valley of Fox River, a stream entering the head of the bay from the east. From this point, which was near the western face of the main range, they turned to the north and followed the foot hills along the front of the range to Turnagain Arm. Topographic maps were made of an area covering about 3,760 square miles. These surveys practically complete the mapping of Kenai Peninsula. Up to last summer much of the topography of the interior of Kenai Peninsula south of Kenai Lake has been unknown and the hypothetical sketches of the area have been very erroneous. In the course of the surveys of this expedition it was proved conclusively that this great area of unknown country was covered by an immense ice cap, the tongues of which shoot out of every valley which connects with the main reservoir. This field is a wonderful sea of ice 70 miles long and twenty miles wide. Its surface, which is a dome, is here and there broken by the crests of mountain islands some of which are over 6,000 feet above sea level. Many of the glaciers, of which there are thirty-six, extend down the valleys for more than ten miles. The crest of this immense reservoir of ice is over 4,500 feet above sea level, while some of the glaciers on the east and south coasts extend entirely to tide water. If the elevations of the valley floors which are covered by this field of ice can be judged by those of similar valleys in the northern part of the Peninsula, its thickness must be between 2,000 and 3,000 feet.

The addition of these new geographic data add much to the map of Alaska. A report on the glaciers of Prince William Sound and the Kenai Peninsula by U. S. Grant and D. F. Higgins based on surveys made in 1909 is now in course of publication.

Until within the past two years the interest of the Alaskan prospector centered chiefly in the search for placer gold, but during the past few months much interest has been manifested in search for lode deposits, with the result that a few valuable auriferous quartz veins have been located. The country about Valdez has proved an important field of search, and, accordingly, an area of 160 square miles was mapped on the scale of 1 : 62,500 by J. W. Bagley during the past season. The most interesting feature in this piece of work is the method by which the work was executed. The plane table was supplemented by the use of a panoramic camera. Although the photo-topographic method has been widely used, this is probably the first extensive application of a panoramic camera for this purpose. Mr. Bagley also constructed by the same method a similar map of a small area in the Moose Pass district on the Kenai Peninsula where extensive lode deposits have been located and a few hundred square miles of country in the northeastern part of the Peninsula on the reconnaissance scale.

A summary of the work of the Geological Survey to date shows the following:

	SCALE.	SQUARE MILES.	PERCENTAGE OF TOTAL AREA OF ALASKA.
Exploratory surveys	(1:625,000)	47,680	8.16
Reconnaissance surveys	(1:250,000)	114,045	19.45
Detailed surveys	(1:62,500)	3,022	.52*

During the fourteen years in which the surveys in the interior of Alaska have been executed under the Geological Survey, the geographic knowledge of the Territory has steadily increased, and although there are many large areas which have not been surveyed, the salient features have been mapped and much data are available concerning areas which have not been visited by members of the Survey.

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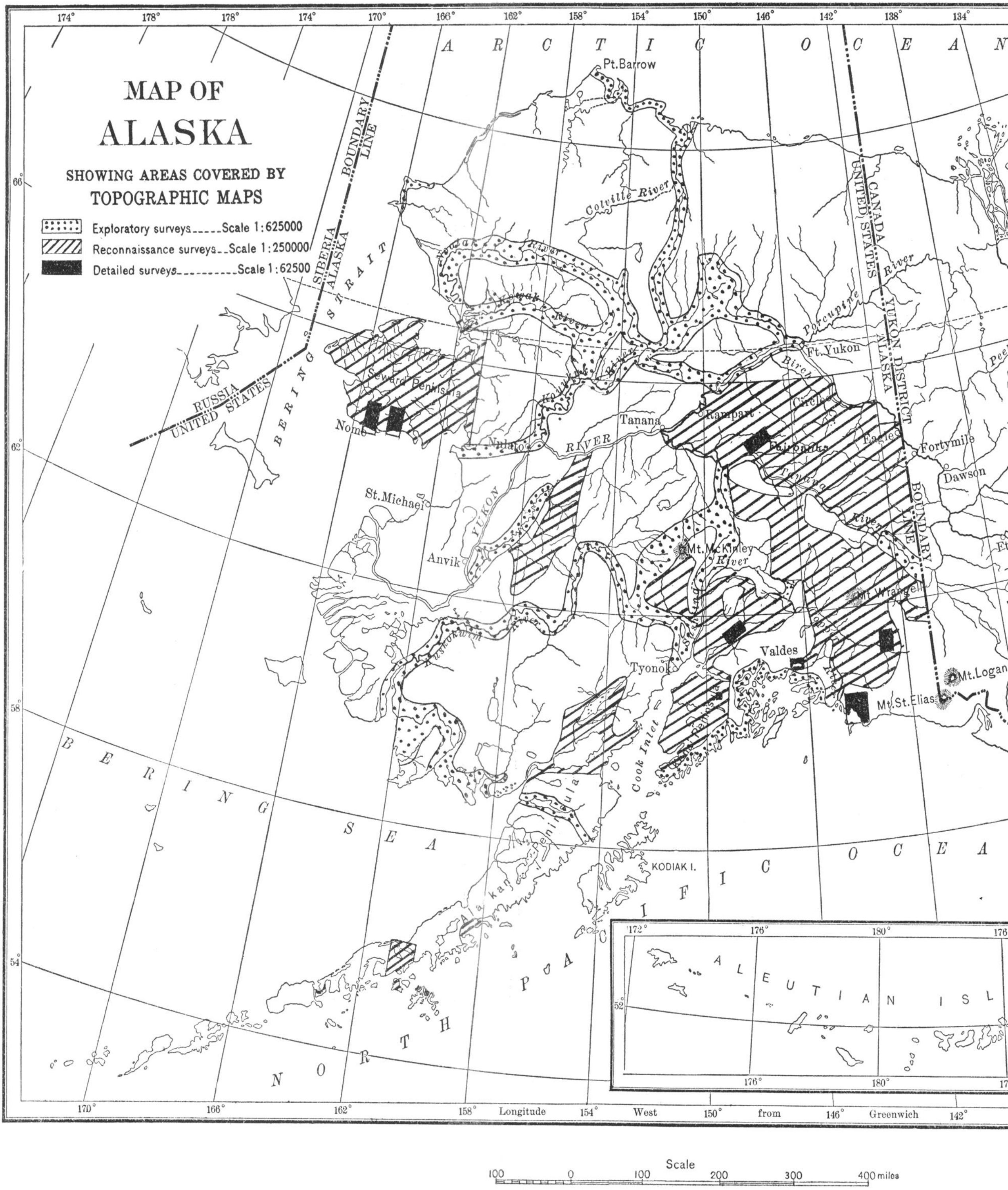
* In addition to the above the International Boundary Survey and the Coast and Geodetic Survey have made surveys of parts of Alaska and the General Land Office has executed subdivisional surveys in four localities within the Territory.

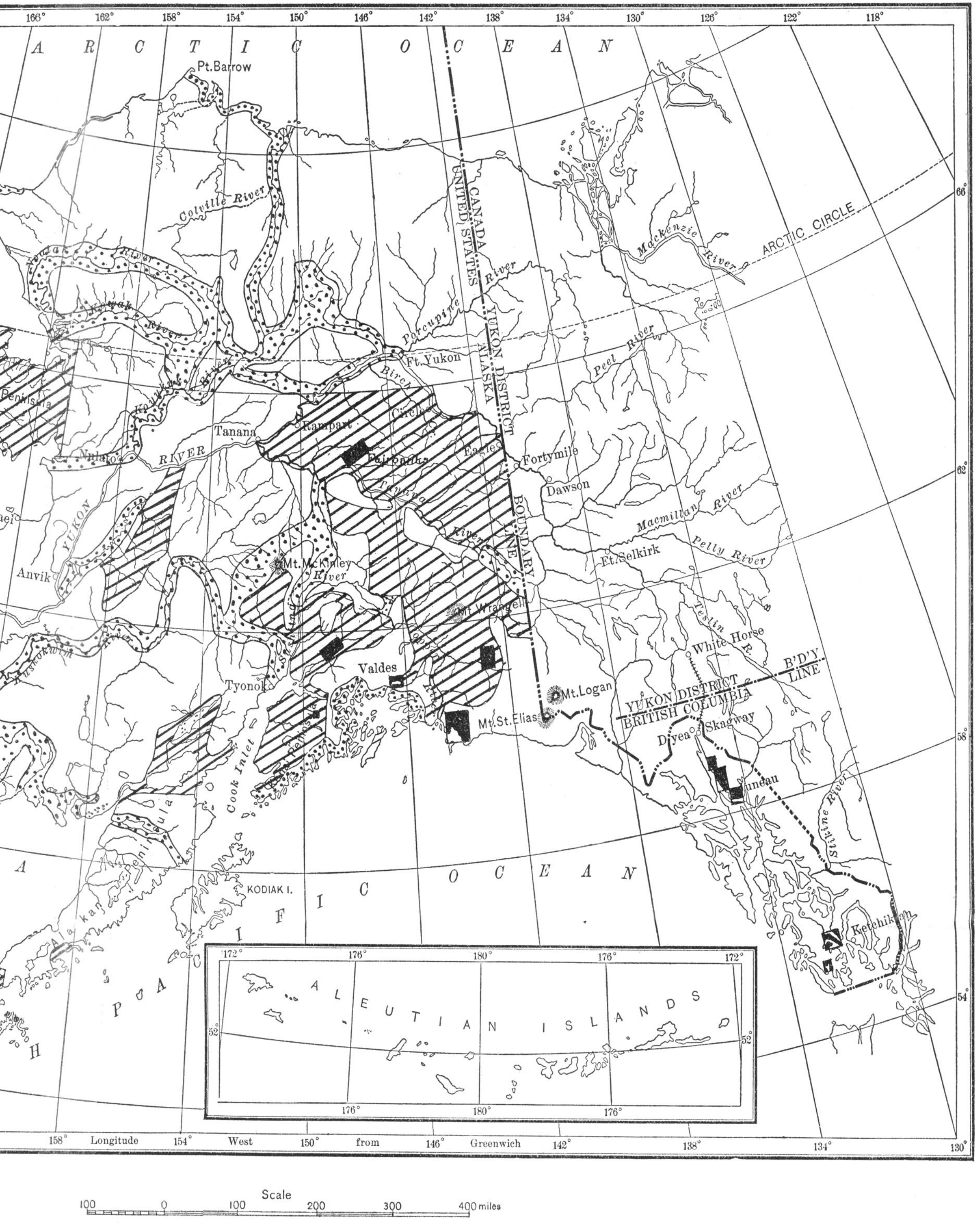
The reconnaissance maps, which now cover an area of approximately 114,000 square miles, or nearly one-fifth of the Territory, are eagerly sought by prospectors and have proved most valuable to them. The detailed surveys have been executed with care and precision and have been of valuable assistance to mine operators and to engineers as a basis for engineering work. The Alaskan topographic maps are usually first used as illustrations accompanying the geologic reports which are for free distribution. Sale editions of the detailed maps are made as soon as the reports in which they are first published are exhausted. The usual price is five or ten cents to cover cost of publication.

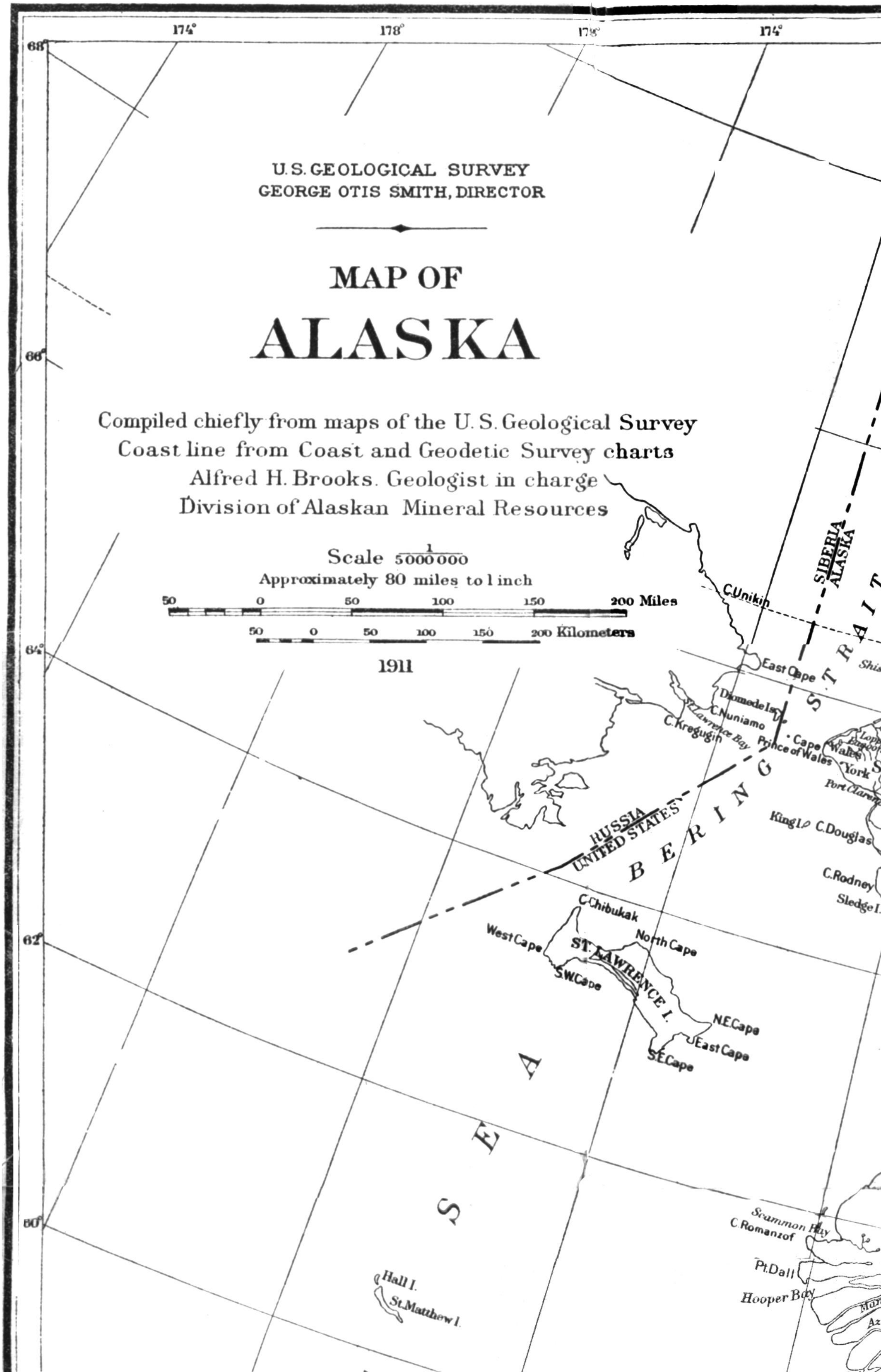
With a view to completing eventually a series of maps on the scale of 1:250,000 covering the entire Territory, a plan has been inaugurated for issuing the maps in sheets covering quadrangles of the earth's surface two degrees north and south and four degrees east and west. These maps, which are 32 by 36 inches, covering an area of approximately 16,400 square miles, are sold for twenty-five cents. Five of these maps have already been published.

The general policy of the Survey in Alaska is to keep pace with the demands for authentic information so far as the appropriations will allow. This demand is met not only by publication of new maps but also by occasional revised editions of maps previously printed.

With improved transportation facilities and better organization of the work, the results are each year becoming more satisfactory. The demand for maps and other publications of the Survey and the hearty cooperation of prospectors, mine operators, business men, and corporations are an evidence of the popularity and value of the work of the Survey in Alaska.


MAP OF
ALASKA
SHOWING AREAS COVERED BY
TOPOGRAPHIC MAPS
Exploratory surveys-----Scale 1:625000
Reconnaissance surveys--Scale 1:250000
Detailed surveys----------Scale 1:62500
A R C T I C O C E A N
Pt. Barrow
Colville River
Noatak River
Kowak River
Koyukuk River
Porcupine River
Ft. Yukon
Birch Cr.
Circle
Rampart
Tanana
Fairbanks
Tanana River
Eagle
Fortymile
Dawson
Seward Peninsula
Nome
Nulato
YUKON RIVER
St. Michael
Anvik
Mt. McKinley
Mt. Wrangell
Kuskokwim River
Tyonok
Valdes
Copper River
Mt. Logan
Mt. St. Elias
Cook Inlet
Kenai Peninsula
Alaska Peninsula
KODIAK I.
SIBERIA
ALASKA
BOUNDARY LINE
RUSSIA
UNITED STATES
BERING STRAIT
CANADA
UNITED STATES
YUKON DISTRICT
ALASKA
BOUNDARY LINE
B E R I N G S E A
N O R T H P A C I F I C O C E A
A L E U T I A N I S L
Longitude West from Greenwich
174° 178° 178° 174° 170° 166° 162° 158° 154° 150° 146° 142° 138° 134°
170° 166° 162° 158° 154° 150° 146° 142°
66° 62° 58° 54° 52°
172° 176° 180° 176°
Scale
100 0 100 200 300 400 miles


ARCTIC OCEAN
Pt. Barrow
Colville River
Noatak River
Kowak River
Koyukuk River
Porcupine River
Ft. Yukon
Birch
Circle
Rampart
Tanana
Nulato
YUKON RIVER
Fairbanks
Tanana River
Eagle
Fortymile
Dawson
Mt. McKinley
Mt. Wrangell
Valdes
Tyonok
Cook Inlet
Kenai Peninsula
Alaska Peninsula
KODIAK I.
Mt. Logan
Mt. St. Elias
Anvik
Kuskokwim River
CANADA
UNITED STATES
YUKON DISTRICT
ALASKA
BOUNDARY LINE
Mackenzie River
ARCTIC CIRCLE
Peel River
Macmillan River
Pelly River
Ft. Selkirk
Teslin R.
White Horse
B'D'Y LINE
YUKON DISTRICT
BRITISH COLUMBIA
Dyea
Skagway
Juneau
Stikine River
Ketchikan
PACIFIC OCEAN
ALEUTIAN ISLANDS
Longitude West from Greenwich
Scale
100 0 100 200 300 400 miles



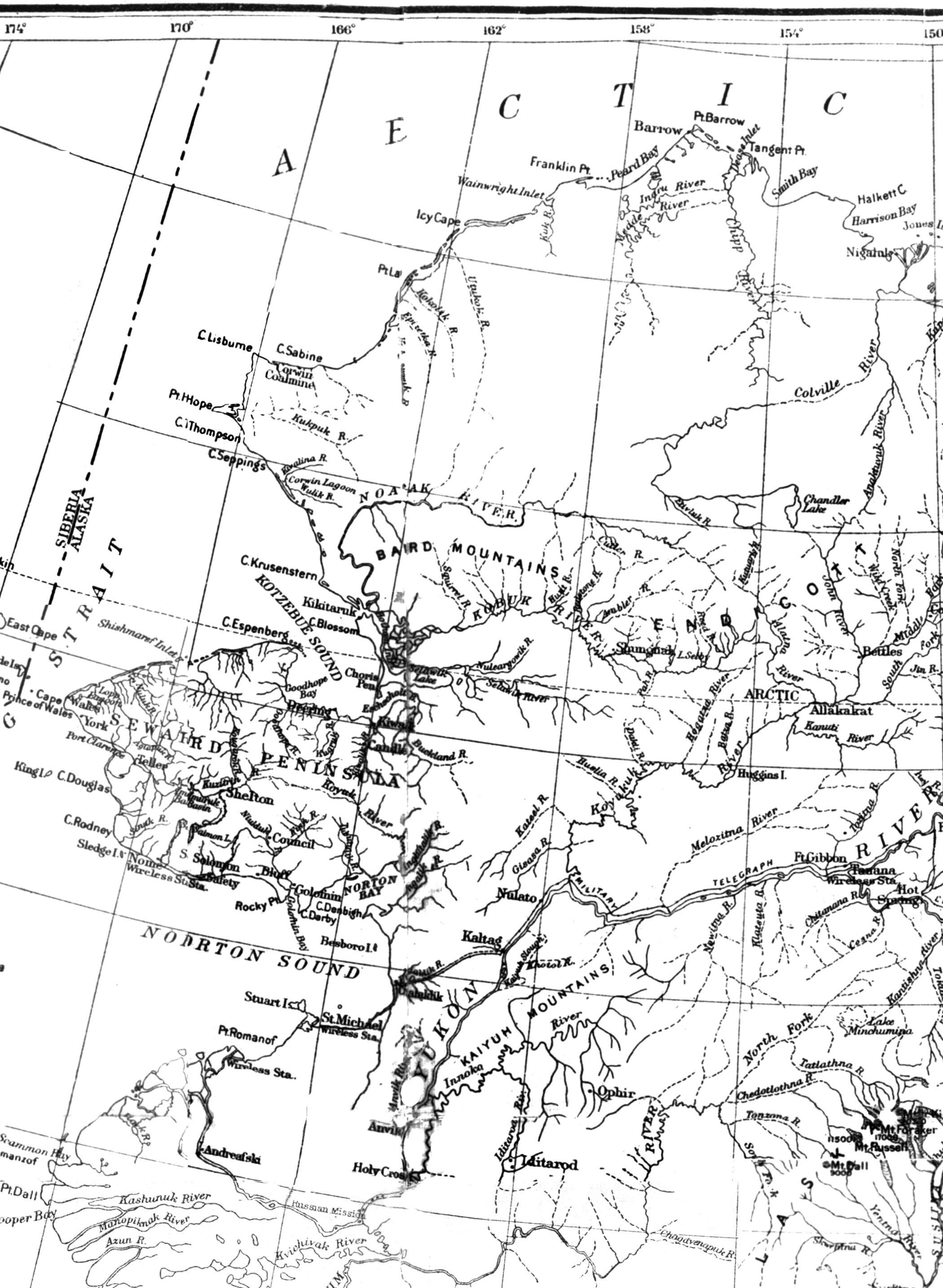
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

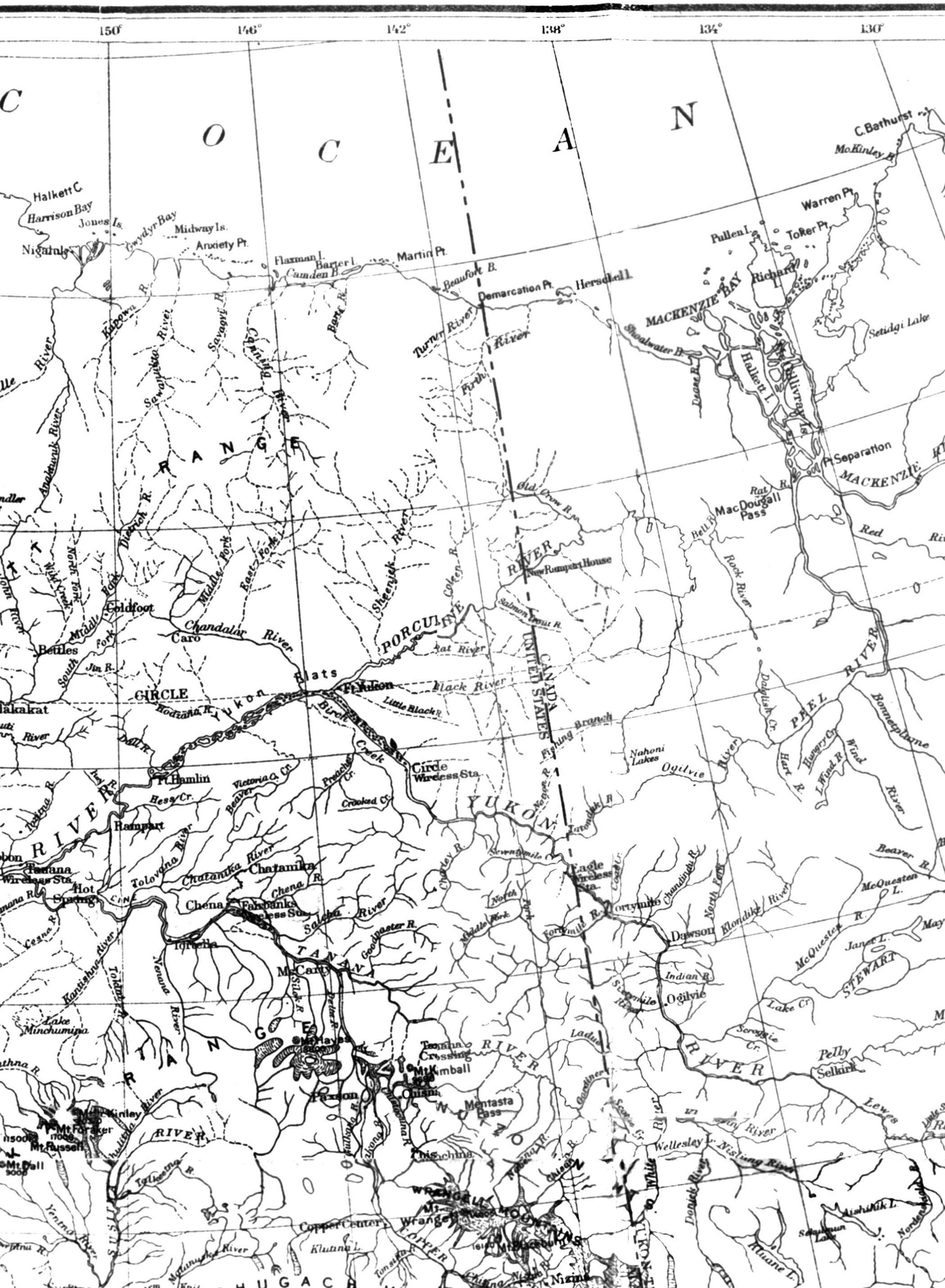
MAP OF
ALASKA

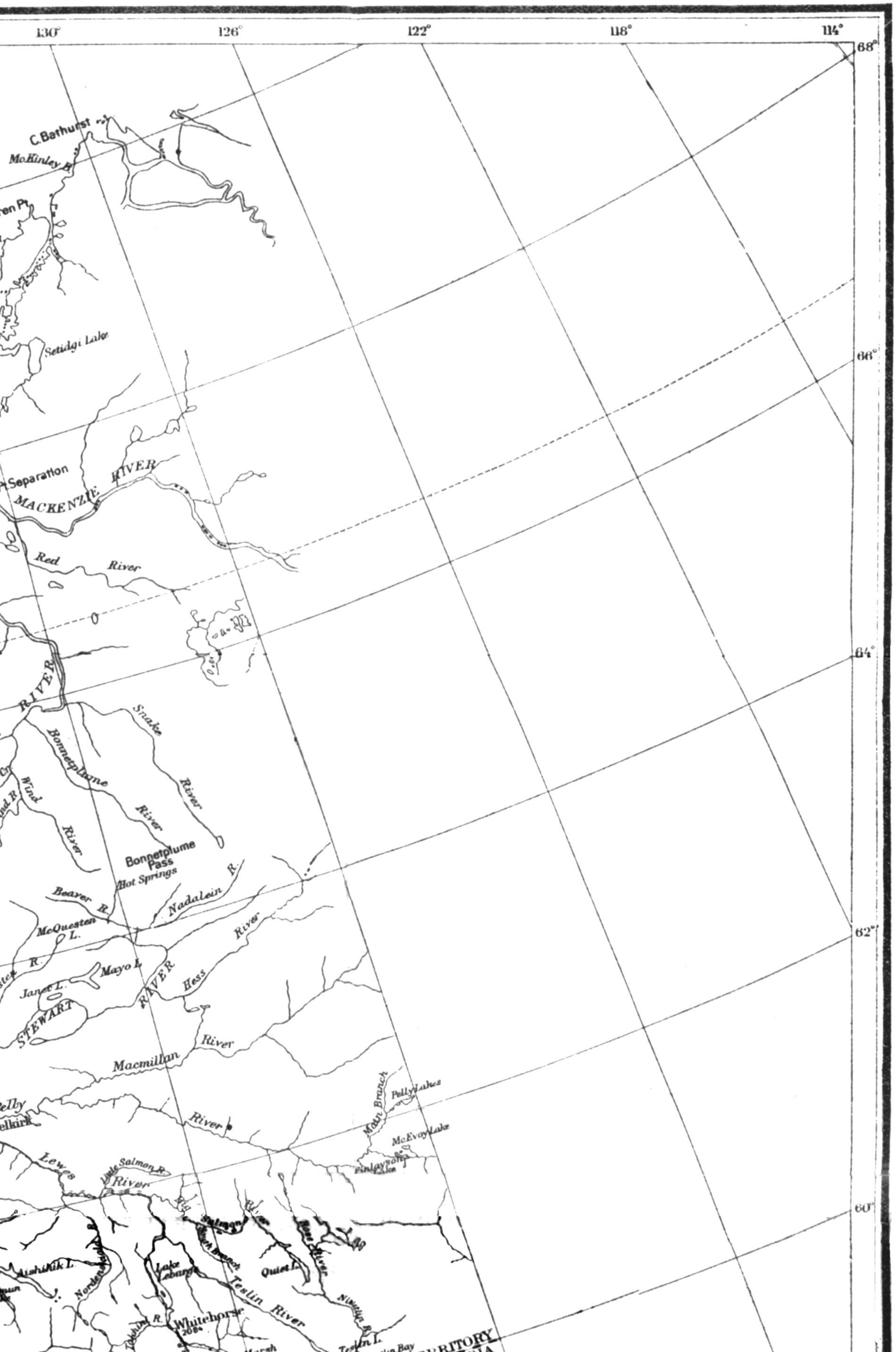
Compiled chiefly from maps of the U. S. Geological Survey
Coast line from Coast and Geodetic Survey charts
Alfred H. Brooks. Geologist in charge
Division of Alaskan Mineral Resources

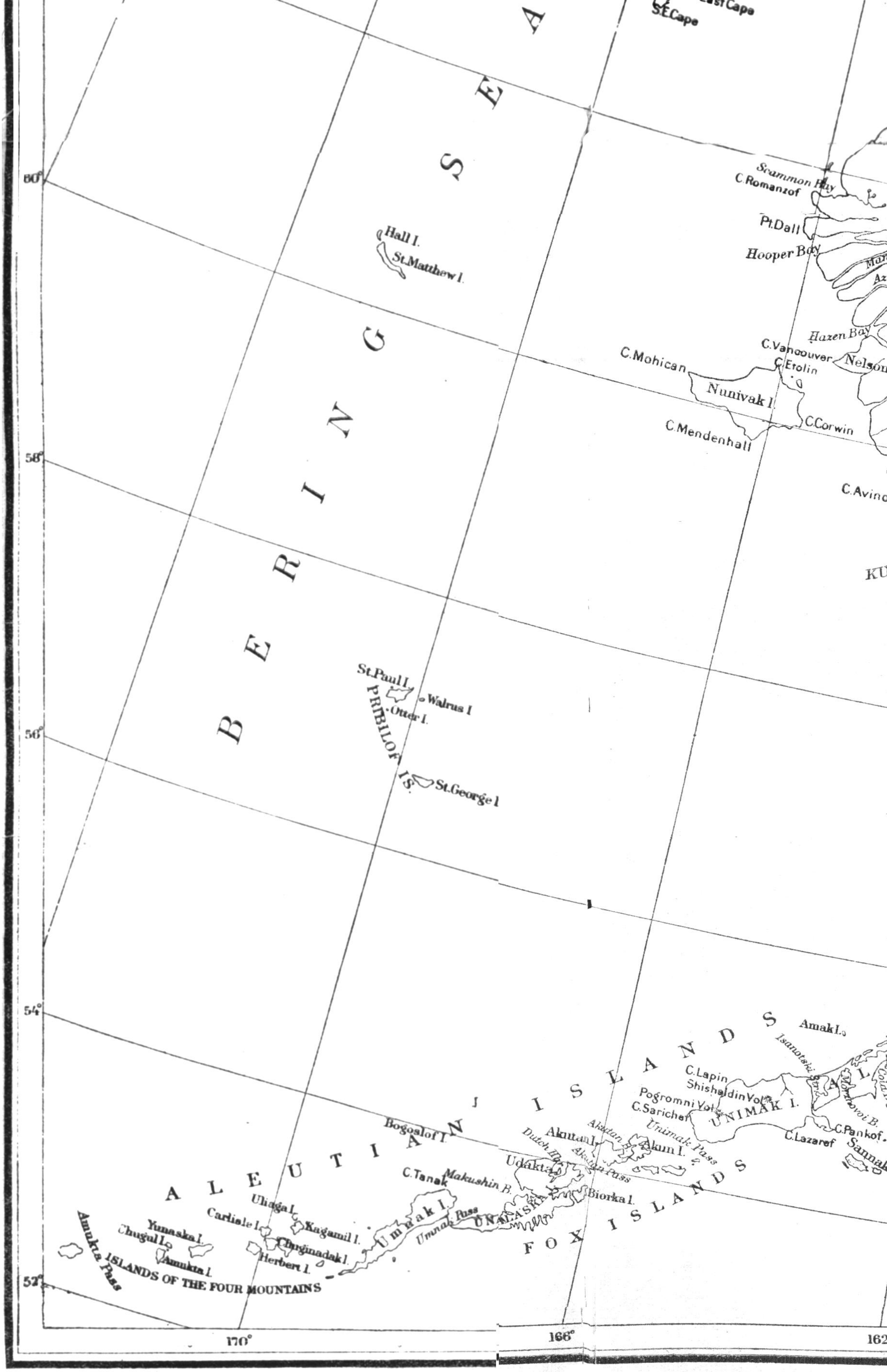
Scale $\frac{1}{5000000}$
Approximately 80 miles to 1 inch

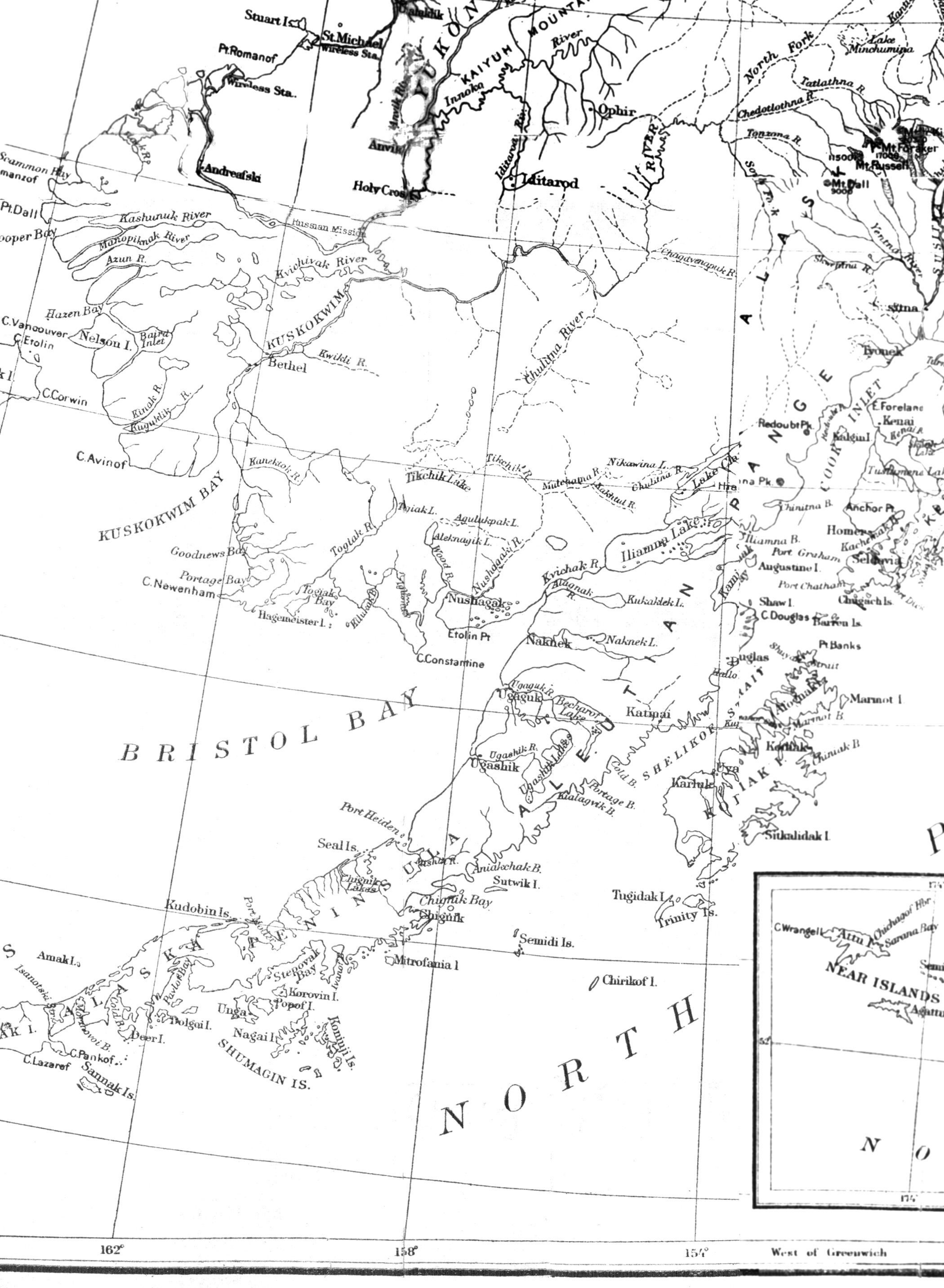
1911

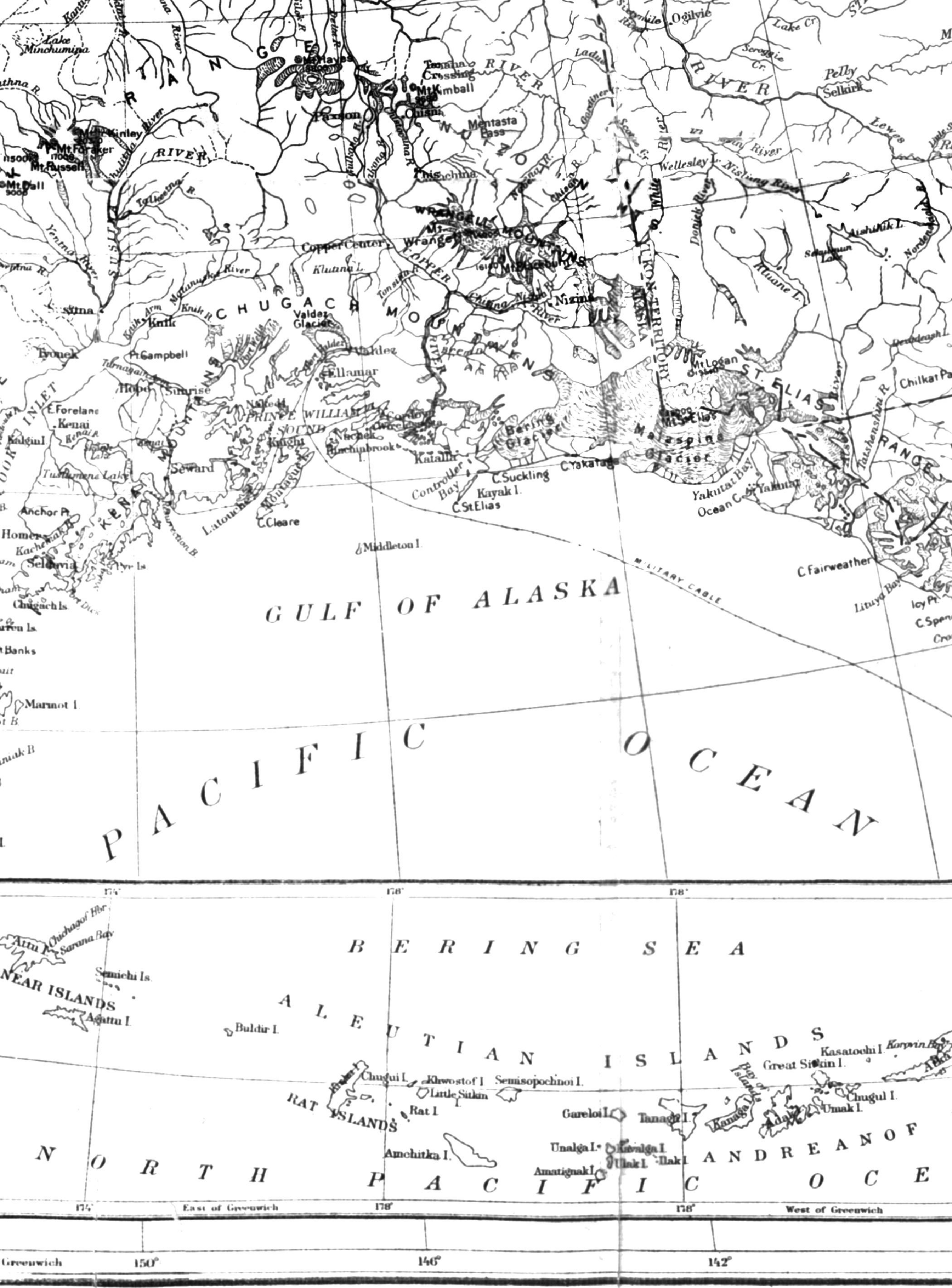

174°
170°
166°
162°
158°
154°
150
A R C T I C
Barrow
Pt.Barrow
Dease Inlet
Tangent Pt.
Smith Bay
Franklin Pt.
Peard Bay
Wainwright Inlet
Inaru River
Meade River
Chipp River
Halkett C.
Harrison Bay
Jones I.
Nigalnik
Icy Cape
Kuk R.
Pt.Lay
Kokolik R.
Utukok R.
Epizetlitok R.
C.Lisburne
C.Sabine
Corwin Coalmine
Pt.Hope
C.Thompson
Kukpuk R.
Colville River
Anaktuvuk River
C.Seppings
Kivalina R.
Corwin Lagoon
Wulik R.
NOATAK RIVER
Chandler Lake
Itivluk R.
SIBERIA
ALASKA
BAIRD MOUNTAINS
C.Krusenstern
KOTZEBUE SOUND
Kikitaruk
C.Blossom
Squirrel R.
KOBUK RIVER
Hunt R.
Redstone R.
Ambler R.
Cutler R.
Kumavik
John River
Wild Creek
North Fork
Middle Fork
South Fork
STRAIT
East Cape
Shishmaref Inlet
C.Espenberg
Shungnak
L.Selby
Reed R.
Alatna River
ENDICOTT
Bettles
Jim R.
Cape Prince of Wales
Wales
Lopp Lagoon
Kuzitrin R.
Goodhope Bay
Choris Pen.
Selawik Lake
Nuleargowik R.
Selawik River
Pah R.
Hogatza River
ARCTIC
Allakakat
Kanuti River
SEWARD PENINSULA
York
Port Clarence
Teller
Deering
Eschscholtz
Kiwalik
Kugruk R.
Candle
Buckland R.
Batza R.
Dakli R.
King I.
C.Douglas
Kuzitrin
Shelton
Imuruk Basin
Royal River
Huslia R.
Koyukuk
Huggins I.
C.Rodney
Sinuk R.
Salmon L.
Niukluk
Fish R.
Council
Tubutulik R.
Inglutalik R.
Katsel R.
Koyukuk River
Melozitna River
Tozitna R.
RIVER
Sledge I.
Nome
Wireless Sta.
Solomon
Safety Sta.
Bluff
Golofnin
NORTON BAY
Ungalik R.
Gisasa R.
Ft.Gibbon
Tanana
Wireless Sta.
Hot Springs
Rocky Pt.
C.Denbigh
C.Darby
Golofnin Bay
Nulato
MILITARY
TELEGRAPH
Nowitna R.
Kluteuya R.
Chitanana R.
Cosna R.
Besboro I.
Kaltag
Kantishna River
NORTON SOUND
Unalaklik R.
Unalaklik
Kaiyuh Slough
Khotol R.
KAIYUH MOUNTAINS
Stuart Is.
St.Michael
Wireless Sta.
YUKON
River
Lake Minchumina
North Fork
Pt.Romanof
Wireless Sta.
Innoka
Tatlathna R.
Chedotlothna R.
Ophir
Anvik River
Anvik
Iditarod Riv.
RIVER
Tonzona R.
Mt.Foraker
17000
Mt.Russell
Mt.Dall
Scammon Bay
Romanzof
Andreafski
Holy Cross
Iditarod
South Fork
Pt.Dall
Kashunuk River
Russian Mission
Hooper Bay
Manopiknak River
Azun R.
Kvichivak River
Chagavenapuk R.
ALASKA
Yentna River
Skwentna R.
SUSITNA

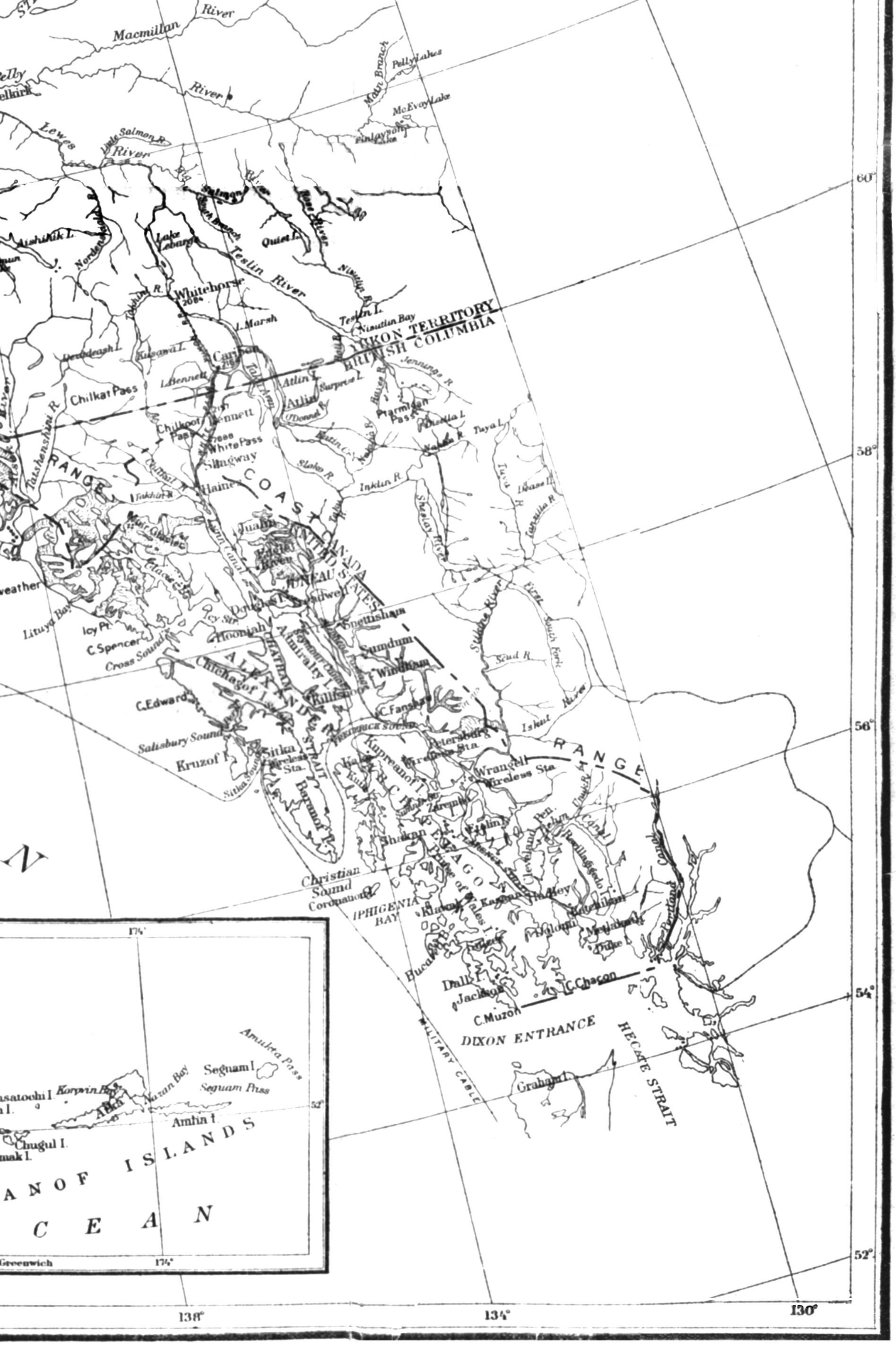

150°
146°
142°
138°
134°
130°
C
O
C
E
A
N
C. Bathurst
McKinley B.
Halkett C.
Harrison Bay
Jones Is.
Gwydyr Bay
Midway Is.
Anxiety Pt.
Nigaluk
Flaxman I.
Barter I.
Camden B.
Martin Pt.
Beaufort B.
Demarcation Pt.
Herschel I.
Warren Pt.
Pullen I.
Toker Pt.
Richards
MACKENZIE BAY
Shoalwater B.
Setidgi Lake
Kuparuk R.
Sagavanirktok River
Savagvik R.
Canning River
Barta R.
Turner River
Firth River
Deane R.
Halkett I.
Mackenzie
Colville River
Anaktuvuk River
Chandler
RANGE
Pt. Separation
MACKENZIE
Old Crow R.
Rat R.
MacDougall Pass
Bell R.
Red
Dietrich R.
Wild Creek
North Fork
Middle Fork
East Fork
Sheenjek River
Coleen R.
RIVER
New Rampart House
Rock River
Coldfoot
Middle Fork
Koyukuk River
Chandalar River
Caro
Bettles
South Fork
Jim R.
PORCUPINE
Salmon Trout R.
Rat River
Black River
Little Black R.
Ft. Yukon
Flats
CIRCLE
Yukon
Hodzana R.
Birch Creek
Dall R.
Allakaket
River
UNITED STATES
CANADA
Fishing Branch
Dalglish Cr.
PEEL RIVER
Bonnetplume
Hart R.
Hungry Cr.
Wind R.
L. Wind R.
Nahoni Lakes
Ogilvie River
Circle
Wireless Sta.
Ft. Hamlin
Preacher Cr.
Victoria Cr.
Beaver Cr.
Hess Cr.
Crooked Cr.
Nation R.
YUKON
Tatonduk R.
Rampart
RIVER
Tanana
Wireless Sta.
Tanana R.
Hot Springs
Tolovana River
Chatanika River
Chatanika
Chena R.
Chena
Fairbanks
Wireless Sta.
Salcha River
Charley R.
Sevenmile
North Fork
Middle Fork
Eagle
Wireless Sta.
Forty mile R.
Fortymile
Chandindu R.
North Fork
Klondike River
Dawson
Beaver R.
McQuesten L.
McQuesten R.
Janet L.
May
Cosna R.
Idricella
Goodpaster R.
TANANA
McCarty
Nenana River
Kantishna River
Toklat R.
Indian R.
Sixtymile River
Ogilvie
STEWART
Lake Cr.
Lake Minchumina
Delta R.
RANGE
Mt. Hayes
Tanana Crossing
RIVER
Mt. Kimball
Paxson
Gulkana
Mentasta Pass
Ladue
Scroggie Cr.
RIVER
Pelly
Selkirk
Lewes
Chulitna River
Mt. McKinley
Mt. Foraker
17000
Mt. Russell
Mt. Dall
RIVER
Talkeetna R.
Gakona R.
Chistochina R.
Nabesna R.
Chisana R.
Snag R.
White River
Wellesley L.
Nisling River
Donjek River
Kluane L.
Aishihik L.
Nordenskiold R.
Tazlina
Wrangell Mountains
WRANGELL MOUNTAINS
Wrangell
Copper Center
Mt. Blackburn
Klutina L.
Matanuska River
Yentna River
SUSITNA
Tonsina R.
Chitina
Nizina
COPPER
CHUGACH


130°
126°
122°
118°
114°
68°
66°
64°
62°
60°
C. Bathurst
McKinley B.
Setidgi Lake
Separation
MACKENZIE RIVER
Red River
RIVER
Snake River
Bonnetplume River
Wind River
Bonnetplume Pass
Hot Springs
Beaver R.
Nadalein R.
McQuesten L.
Hess River
Mayo L.
Janet L.
STEWART RIVER
Macmillan River
Pelly River
Selkirk
Main Branch
Pelly Lakes
McEvoy Lake
Finlayson Lake
Lewes River
Little Salmon R.
Big Salmon River
South Branch
Aishihik L.
Nordenskiold R.
Lake Lebarge
Quiet L.
Ross River
Teslin River
Nisutlin R.
Takhini R.
Whitehorse
2084
Marsh
Teslin L.
TERRITORY


East Cape
S.E.Cape
BERING SEA
60°
Scammon Bay
C.Romanzof
Pt.Dall
Hooper Bay
Hall I.
St.Matthew I.
Hazen Bay
C.Vancouver
C.Etolin
Nelson
C.Mohican
Nunivak I.
C.Corwin
C.Mendenhall
58°
C.Avino
KU
St.Paul I.
Walrus I.
Otter I.
PRIBILOF IS.
St.George I.
56°
54°
Amak I.
Isanotski Str.
C.Lapin
Shishaldin Vol.
Pogromni Vol.
C.Sarichef
UNIMAK I.
C.Pankof
C.Lazaref
Sannak
ALEUTIAN ISLANDS
Bogoslof I.
Akutan I.
Akutan Pass
Unimak Pass
Akun I.
Dutch Hr.
Akutan Pass
Udakta
Biorka I.
C.Tanak
Makushin B.
UNALASKA I.
FOX ISLANDS
Umnak I.
Umnak Pass
Uliaga I.
Carlisle I.
Kagamil I.
Chuginadak I.
Herbert I.
Yunaska I.
Chugul I.
Amukta I.
Amukta Pass
ISLANDS OF THE FOUR MOUNTAINS
52°
170°
166°
162


Stuart I.
St. Michael
Wireless Sta.
Pt. Romanof
Wireless Sta.
Unalakleet
YUKON
KAIYUH MOUNTAINS
River
Innoko
Anvik R.
Anvik
Holy Cross
Andreafski
Scammon Bay
Romanzof
Pt. Dall
Cooper Bay
Kashunuk River
Manopiknak River
Azun R.
Russian Mission
Kvichivak River
Ophir
Iditarod Riv.
Iditarod
RIVER
North Fork
Lake Minchumina
Tatlathna R.
Chedotlothna R.
Tonzona R.
Mt. Foraker 17000
Mt. Russell
Mt. Dall 9000
South Fork
Yentna River
Skwentna R.
Susitna
SUSITNA
Chagvenapuk R.
Hazen Bay
C. Vancouver
C. Etolin
Nelson I.
Baird Inlet
KUSKOKWIM
Bethel
Kwikli R.
Chulitna River
C. Corwin
Kinak R.
Kuguklik R.
ALASKA RANGE
Tyonek
E. Foreland
Kenai
Kalgin I.
COOK INLET
Redoubt Pk.
C. Avinof
Kanektok R.
KUSKOKWIM BAY
Tikchik R.
Tikchik Lake
Nikawina L.
Mulchatna R.
Chulitna R.
Koktuli R.
Lake Clark
Anchor Pt.
Chinitna B.
Homer
Kachemak B.
Seldovia
Togiak L.
Agulukpak L.
Togiak R.
Aleknagik L.
Wood R.
Nushagak R.
Iliamna Lake
Iliamna B.
Port Graham
Augustine I.
Goodnews Bay
Portage Bay
C. Newenham
Togiak Bay
Kvichak R.
Alagnak R.
Kamishak B.
Port Chatham
Chugach Is.
Nushagak
Kukaklek L.
Shaw I.
C. Douglas
Barren Is.
Hagemeister I.
Igushik R.
Snake R.
Etolin Pt.
Naknek
Naknek L.
C. Constantine
Pt. Banks
Shuyak I.
Strait
Marmot I.
Ugaguk R.
Ugaguk
Becharof Lake
Katmai
Afognak I.
Marmot B.
BRISTOL BAY
Ugashik R.
Ugashik
Ugashik Lakes
Cold B.
SHELIKOF STRAIT
Kodiak
Chiniak B.
Uyak
Karluk
Portage B.
Kialagvik B.
KODIAK I.
ALEUTIAN RANGE
Port Heiden
Seal Is.
Sitkalidak I.
Aniakchak R.
Aniakchak B.
Sutwik I.
Chignik Lakes
Chignik Bay
Chignik
Tugidak I.
Trinity Is.
Kudobin Is.
Port Moller
Semidi Is.
ALASKA PENINSULA
Amak I.
Isanotski Str.
Stepovak Bay
Ivanof B.
Mitrofania I.
Chirikof I.
Pavlof Bay
Korovin I.
Popof I.
Unga
Dolgoi I.
Morzhovoi B.
Cold B.
Deer I.
Nagai I.
Koniuji Is.
UNIMAK I.
C. Pankof
C. Lazaref
Sannak Is.
SHUMAGIN IS.
NORTH
P
C. Wrangell
Attu I.
Chichagof Hbr.
Sarana Bay
NEAR ISLANDS
Semichi
Agattu
52
174
174
N O
162°
158°
154°
West of Greenwich


Lake Minchumina
R A N G E
Mt Hayes
Tanana Crossing
Mt Kimball
Paxson
Chisna
Mentasta Pass
Mt McKinley
Mt Foraker
Mt Russell
Mt Dall
Chulitna River
RIVER
Talkeetna R.
Yentna River
SUSITNA
Ogilvie
Ladue
Lake Cr.
Scroggie Cr.
RIVER
Pelly
Selkirk
Lewes
White River
Wellesley
Nisling River
Donjek River
Aishihik L.
Nordenskiold R.
Kluane L.
Chistochina
WRANGELL MOUNTAINS
Mt Wrangell
Mt Blackburn
Copper Center
Klutina L.
Tonsina R.
COPPER RIVER
Chitina R.
Nizina R.
Nizina
Matanuska River
Knik
Knik Arm
CHUGACH MOUNTAINS
Valdez Glacier
Valdez
Ellamar
Pt Campbell
Tyonek
Turnagain Arm
Hope
Sunrise
COOK INLET
E. Foreland
Kenai
Kalgin I.
Tustumena Lake
Seward
KENAI MOUNTAINS
PRINCE WILLIAM SOUND
Naked I.
Knight
Nuchek
Hinchinbrook
Cordova
Katalla
Controller Bay
C. Suckling
Kayak I.
C. St Elias
C. Yakataga
Bering Glacier
Malaspina Glacier
Mt Logan
Mt St Elias
ST. ELIAS
YUKON TERRITORY
ALASKA
Alsek River
Tatshenshini R.
Chilkat R.
RANGE
Yakutat Bay
Yakutat
Ocean C.
C. Fairweather
Lituya Bay
Icy Pt.
C. Spencer
Anchor Pt.
Homer
Kachemak B.
Seldovia
Chugach Is.
Barren Is.
Banks
Marmot I.
Latouche I.
Montague I.
Resurrection B.
C. Cleare
Middleton I.
MILITARY CABLE
GULF OF ALASKA
PACIFIC OCEAN
174°
178°
178°
BERING SEA
Attu I.
Chichagof Hbr.
Sarana Bay
Semichi Is.
NEAR ISLANDS
Agattu I.
Buldir I.
ALEUTIAN ISLANDS
Kiska I.
Chugul I.
Khwostof I.
Little Sitkin I.
Semisopochnoi I.
RAT ISLANDS
Rat I.
Amchitka I.
Gareloi I.
Tanaga I.
Unalga I.
Kavalga I.
Ulak I.
Ilak I.
Amatignak I.
Kanaga I.
Bay of Islands
Adak I.
Great Sitkin I.
Kasatochi I.
Korovin Bay
Atka I.
Chugul I.
Umak I.
ANDREANOF
NORTH PACIFIC OCEAN
174°
East of Greenwich
178°
178°
West of Greenwich
Greenwich
150°
146°
142°


Macmillan River
Pelly
Selkirk
Pelly River
Main Branch
Pelly Lakes
McEvoy Lake
Finlayson Lakes
Lewes
Little Salmon R.
River
Big Salmon River
South Branch
Lake Lebarge
Rose River
Aishihik L.
Nordenskiold R.
Quiet L.
Teslin River
Nisutlin R.
Whitehorse
Takhini R.
L. Marsh
Teslin L.
Nisutlin Bay
YUKON TERRITORY
BRITISH COLUMBIA
Dezadeash L.
Kusawa L.
Caribou
L. Bennett
Atlin L.
Atlin
Surprise L.
Jennings R.
Chilkat Pass
Tatshenshini R.
Chilkoot Pass
Bennett
White Pass
Skagway
O'Donnel R.
Ptarmigan Pass
Dease L.
Tuya L.
RANGE
Haines
Sloko R.
Inklin R.
COAST
Lynn Canal
Juneau
Taku R.
Muir Glacier
Glacier Bay
UNITED STATES
CANADA
Fairweather
JUNEAU
Treadwell
Douglas I.
Lituya Bay
Icy Pt.
Icy Str.
Hoonah
Snettisham
C. Spencer
Cross Sound
Chatham
Admiralty I.
Sumdum
Windham
Stikine River
Scud R.
South Fork
ALEXANDER
Chichagof I.
C. Edward
Killisnoo
C. Fanshaw
Iskut River
Salisbury Sound
Frederick Sound
Petersburg
Kruzof I.
Sitka
Wireless Sta.
Kake
Kupreanof I.
Wrangell
Wireless Sta.
RANGE
Sitka Sound
Baranof I.
ARCHIPELAGO
Zarembo I.
Etolin I.
Cleveland Pen.
Behm Canal
Unuk R.
Shakan
Revillagigedo I.
Christian Sound
Coronation I.
Prince of Wales I.
IPHIGENIA BAY
Klawak
Kasaan
Hadley
Ketchikan
Metlakatla
Portland Canal
Bucareli B.
Howkan
Duke I.
Dall I.
Jackson
C. Chacon
C. Muzon
DIXON ENTRANCE
HECATE STRAIT
MILITARY CABLE
Graham I.
60°
58°
56°
54°
52°
138°
134°
130°
174°
Kasatochi I.
Koryvin Bay
Atka
Nazan Bay
Segnam I.
Seguam Pass
Amukta Pass
Amlia I.
Chugul I.
ISLANDS
OF
CEAN
Greenwich
52°